

# **PresencePLUS<sup>®</sup> P4**

Models included:

- GEO
- EDGE

*quickstart*



more sensors, more solutions



### **WARNING . . . Not To Be Used for Personnel Protection**

**Never use this product as a sensing device for personnel protection. Doing so could lead to serious injury or death.**

This product does NOT include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition. Consult your current Banner Safety Products catalog for safety products which meet OSHA, ANSI and IEC standards for personnel protection.



### **CAUTION . . . Electrostatic Discharge**

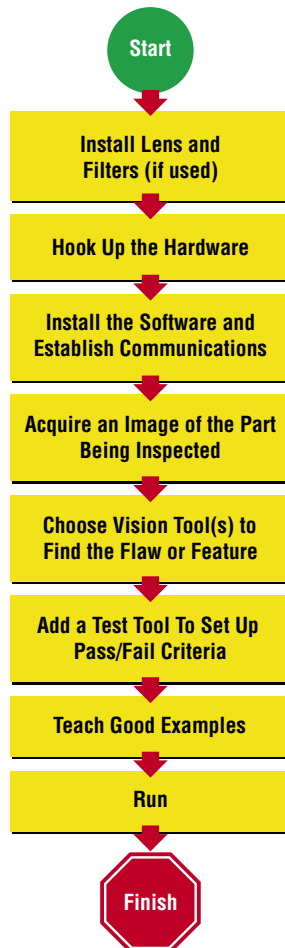
**Avoid the damage that electrostatic discharge (ESD) can cause to the Sensor.**

Always use a proven method for preventing electrostatic discharge when installing a lens or attaching a cable.

## Introducing PresencePLUS P4

The PresencePLUS P4 (or the Sensor) is an easy-to-use vision sensor with advanced visual inspection capabilities. With minimal knowledge of vision, a user can quickly set up the Sensor to run an inspection that tests all products and accurately rejects bad products on a production line.

Inspections are set up using a personal computer (PC) or by activating the Remote Teach input. The Sensor captures images and analyzes them using one or more Vision tools to pass or fail the product. The PC is not required for running inspections after the inspection files have been stored in the Sensor's memory.



### Quick Start Overview

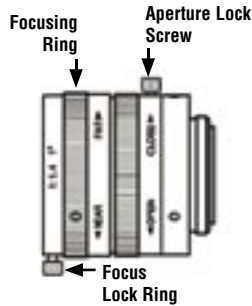
This guide is designed to provide – even to those new to vision sensing – the information needed to use this sensor. It provides an overview of the PresencePLUS P4 and illustrates how to easily set up the Sensor to inspect a product. The flow chart at left provides an overview of the process.

#### TIPS

For more detailed instructions, refer to the User's Manual on the installation CD.

## step 1

1. Install the lens and filter (if used). Any C-mount lens may be used with PresencePLUS P4 Sensors. For non-Banner lenses, follow the lens manufacturer's unpacking and installation instructions.



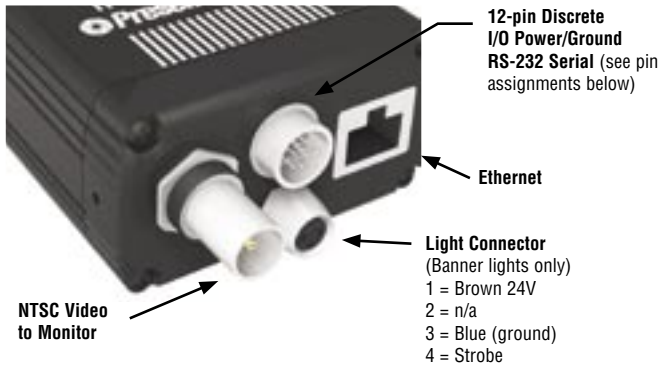
NOTE: If the lens has a focus lock screw, loosen the screw before focusing the lens. Some lenses also have an aperture lock screw.

## step 2

### Cable Connections

1. If a light will be powered by the Sensor, connect it to the 3-pin Light connector.
  - a. Caution: If the light is powered by the Sensor, the Sensor power source must be 24V dc.
  - b. Caution: This connection is for Banner light models only!
2. If an NTSC monitor is used, connect it to the Sensor via a BNC-to-BNC cable to the NTSC Video monitor connector.
3. Connect the Ethernet cable from your PC to the Sensor at the RJ-45 connector.
  - a. If connecting directly from the PC, use a crossover cable.
  - b. If connecting the Sensor to a hub or router, use straight cables to the Sensor as well as to the PC.

- Connect the Sensor power-discrete I/O wires (the leads on the 12-wire furnished cable) to the appropriate locations (see chart below).



**12-Wire Cable**

Pin #	Wire Color	Description	Direction
1	Yellow	RS-232 TX	Output
2	Gray	Remote Teach	Input
3	Orange	Product Change	Input
4	Pink	External Trigger	Input
5	Black	Discrete I/O #1	In/Out
6	Red	Discrete I/O #2	In/Out
7	White	Discrete I/O #3	In/Out
8	Light Blue	Discrete I/O #4	In/Out
9	Violet	RS-232 RX	Input
10	Green	RS-232 Signal Ground	Output
11	Blue	Common (Signal Ground)	Input
12	Brown	10-30V dc	Input

**Crossover Ethernet Cable  
(to PC Ethernet Port)\***

STPX07 — 2.1 m (7')  
 STPX25 — 7.6 m (25')

or

**Standard Ethernet Cable  
(to PC via Network Hub or Switch)**

STP07 — 2.1 m (7')  
 STP25 — 7.6 m (25')

**Monitor Cable (to Video Monitor, optional)**

BNC06 — 2 m (6')  
 BNC15 — 5 m (15')  
 BNC30 — 9 m (30')

\*The Sensor can be connected to the PC via a serial cable or an Ethernet network; Ethernet provides faster communication.

**TIPS**

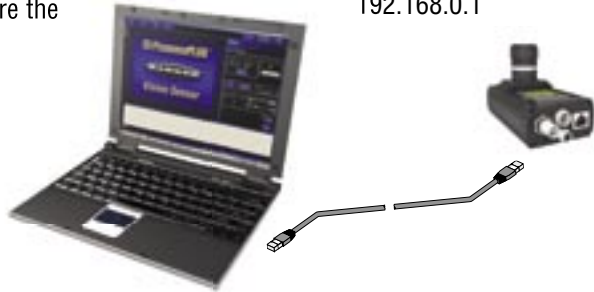
The trigger device can be any 10-30V dc photoelectric sensor, or a device with a similar output.

## step 3

### PC Configuration

1. Ethernet communication, configure the IP address of your computer.

Typical IP Address:  
192.168.0.2



### Sensor

Default IP Address  
192.168.0.1

Write down the existing address of your PC before changing it: . . . . .

To change the IP address of your PC, do the following:

(The following screen captures are from Windows NT; other Windows versions vary.)



- a. Right mouse-click on **Network Neighborhood** and select **Properties**



- b. Open the TCP/IP Properties under the Protocols tab



- c. Change the IP address to **192.168.0.2** and subnet mask to **255.255.255.0**

2. Install the PresencePLUS software

- a. Insert the Installation CD
- b. Click **Install PresencePLUS Software**



## step 4

### Starting the PresencePLUS P4

1. Power up the hardware and verify that the Power/Error light turns Green.



## step 5

### Launching Software

1. Start the PresencePLUS program by clicking **Start > Program Files > PresencePLUS.**
2. At start-up, PresencePLUS P4 will try to communicate with the Sensor.
  - If communication with the Sensor is successful, the application will launch and display the Setup or Run screen.
  - If the current communication port is not available, the application will prompt you to select a different port. Click **OK** to access the Communications window.

#### To Change the Communication Port

- Ethernet connection:
    - a. Choose **Ethernet [RJ45]**
    - b. Type: **192.168.0.1** in the space provided
    - c. Click **OK**
  - Serial connection:
 

Choose **serial**. Refer to the User's Manual (on software CD; see back cover for part number) for detailed instructions on serial port configuration.
3. If using an optional NTSC video monitor, verify that the monitor is displaying an image.
  4. When the software launches, create an inspection, configure the discrete I/O, and begin running inspections.



#### TIPS

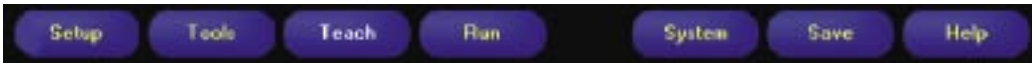
**DO NOT click Modify Camera IP Address** when trying to establish communications. **Modify** works only after communications have been established.

**NOTE:** Initially, all discrete I/O are configured as inputs. Go to the System window to change the discrete I/O. For detailed configuration information, refer to the User's Manual (on software CD; see back cover for part number).

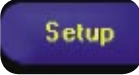
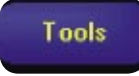
## step 6

### Software Setup

Use the Main Menu toolbar to navigate the PresencePLUS P4 options. Proceeding from left to right, the buttons in the Menu toolbar step through the process of creating an inspection file.



#### Inspection Work Flow

1.  Set up the Sensor, lens, and lighting, to acquire a reference image.
  - a. Set up the Sensor lens and lighting.
  - b. Choose Trigger option **Continuous** for a live image.
  - c. Click **Auto Exposure** to adjust the brightness.
  - d. Focus the Sensor lens by turning the lens until the Focus Number is maximized.
  
2.  Add tools to the inspection. Build the tools from scratch or add tools from a previous inspection file saved on the PC or the Sensor. To add a Vision tool, click the Tool button. To remove a tool, click the "X" in the lower left corner of the screen.
  - a. Add **Location tool(s)** to find the target to adjust the following Regions of Interest (ROI) for transitional and rotational changes.
  - Required** b. Add **Vision tool(s)** to inspect the part.
  - c. Add **Measure tool(s)** to create distance measurements from points found.
  - Required** d. Add **Test tool(s)** to set the Pass/Fail criteria. (The Vision and Measure tools are inputs to the Test tool.)

#### TIPS

Before creating an inspection file, set up the electrical configuration of the external trigger. (Click **System** button, select **Trigger** tab.)

NOTES: • Click **Quick Teach** to automatically set all the selected parameters in the Test tool and proceed to the Run screen, or click **Next** to proceed to the Teach screen, to teach a sample set of good products.

- If you want to keep parameters in a Test tool, skip **Teach** and go directly to **Run**.



## Tool Options

NOTE: Tool availability depends on P4 model.

Tool Name		Function	Description
Location Tools	<b>GEO Find</b>	Translation and rotation	Locates the target by searching for a taught pattern and compensates for translation and rotation.
	<b>Locate</b>	Translation and rotation	Finds the edge of the part and compensates for translation and rotation (if selected).
Vision Tools	<b>GEO Count</b>	Finds one or more patterns	Locates and counts a taught pattern.
	<b>Edge</b>	Counts and locates edges	Detects and counts transitions between bright and dark pixels. The total number of edges can be counted, and the position of each edge can be found.
	<b>Object</b>	Locates and counts objects, determines midpoints, and measures widths	Detects the edges of dark and bright objects, locates their midpoints, counts dark and bright objects, and measures the width of each dark and bright object.
Analysis Tools	<b>Measure</b>	Measures between points	Measures distance between two prescribed points. These points can be either edges or centroid locations.
	<b>Test</b>	Logic input/output	Evaluates results of selected Vision and Analysis tools to determine whether an inspection passes or fails. It also performs logical operations and activates outputs.

3.



This screen automatically configures the parameters chosen in the Tools screen.

- a. Choose the sample size
- b. Click **Start**
- c. Trigger the controller with the external trigger device
- d. Click **Stop**
- e. Click **Next** to proceed to Run

Before entering Run, save the inspection file to one of the 12 memory locations on the Sensor.

### TIPS

- Each inspection must contain at least one Vision tool and one Test tool.
- Save a backup copy of your inspection to the host PC.

4.



Select an inspection to run, and view the results of the inspection.

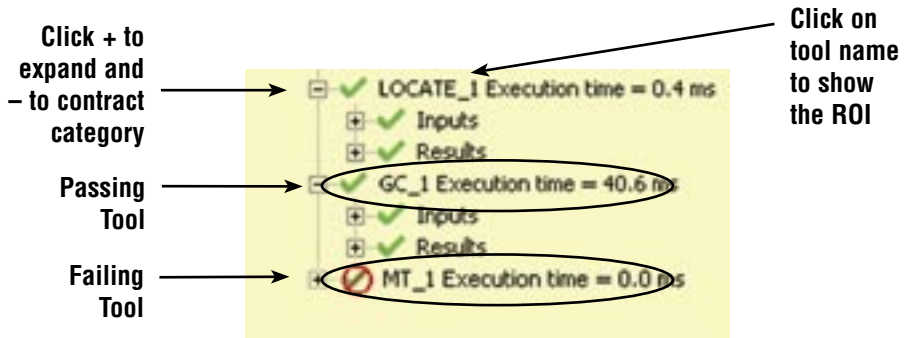
To select an inspection, (in the Select tab) enable **Software Override** and select the inspection file from the list of stored inspections.

Alternate method: Use **Hardware Input** to select an inspection via Product Change and Product Select lines.

### Viewing Results

Display Options

<b>Next Pass</b>	Display only the next passing inspection.
<b>Next Fail</b>	Display only the next failing inspection.
<b>Next RT</b>	Display the next remote teach.
<b>Next RT Fail</b>	Display the next unsuccessful remote teach.
<b>Next</b>	Continuously display inspections.
<b>None</b>	Don't display any inspections.



To begin inspecting, click the **Start** button in the Run screen.

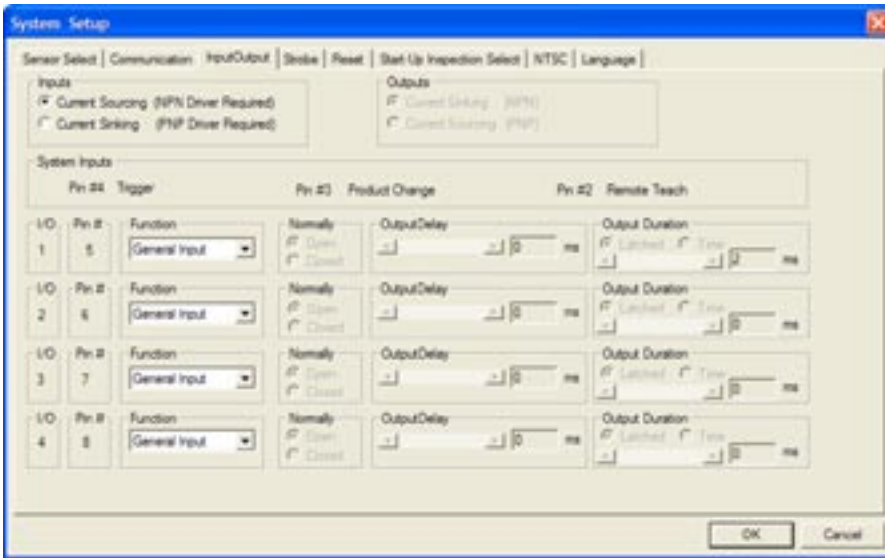
**TIPS**

When using the Hardware input, pulse the **Product Change** and **Product Select** inputs to initiate an inspection change. See User's Manual for complete information.

# step 7

## System Setup

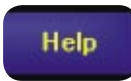
Use the System Setup screen to change discrete I/O, the communication port, the product change, the strobe output (for external lighting control), the trigger input, and to view diagnostic information.



InputOutput Configuration Tab



Save inspections on the PC.



- Provides: Operation Help
- Installation Help
- Lens Selection Help
- Lighting Help
- Error Codes
- About

## **Maintenance**

Maintenance tasks include keeping the hardware free of dust and dirt and updating the PresencePLUS software as new versions become available.

### **Cleaning the Sensor**

Regularly remove any accumulated dust or dirt from the Sensor using a soft cloth. If needed, slightly dampen the cloth with a weak solution of neutral detergent. Avoid getting dirt on the Sensor's imager (the area behind the lens). If the imager is dirty, use anti-static compressed air to blow off the dust.

### **Cleaning the Sensor Lens**

Regularly remove dust, dirt, or fingerprints from the lens. Use anti-static compressed air to blow off dust. If necessary, use a lens cloth and lens cleaner or window cleaner to wipe off remaining debris. Do not use any other chemicals for cleaning.

### **Updating PresencePLUS Software**

The current version of PresencePLUS software is available for download from the Banner website:

[www.bannerengineering.com](http://www.bannerengineering.com)

## Troubleshooting

Problem	Cause/Solution
<ul style="list-style-type: none"> <li>• Error Code is displayed on PC.</li> </ul>	<ul style="list-style-type: none"> <li>• A list of error codes and potential causes and solutions are available under Help/About on the PresencePLUS software CD.</li> </ul>
<ul style="list-style-type: none"> <li>• Power light is not ON.</li> <li>• Interface cannot connect to Sensor.</li> <li>• No image on monitor.</li> </ul>	<p><b>Sensor not getting enough power</b></p> <ul style="list-style-type: none"> <li>• Verify that the power supply is 10–30V dc with 500 milliamps maximum current. (NOTE: If light source is powered by the Sensor, power supply must be 24V dc.)</li> <li>• Check the connection to the power supply.</li> </ul>
<ul style="list-style-type: none"> <li>• No image on PC or monitor.</li> <li>• Sensor Ready/Trigger LED is Green.</li> <li>• The software seems to be working correctly, but the image is missing.</li> </ul>	<p><b>Sensor not receiving triggers</b></p> <ul style="list-style-type: none"> <li>• Ensure that the Sensor is receiving triggers. The trigger mode can be Continuous, External, or Manual.</li> <li>• If the connections are secure, call a Banner Applications Engineer.*</li> </ul>
<ul style="list-style-type: none"> <li>• Error message, “Failed to capture a full-resolution image. Please try again.”</li> <li>• Image is frozen on PC and monitor.</li> <li>• Sensor Power/Error LED is Red.</li> </ul>	<p><b>Software restart needed or loose connections</b></p> <ul style="list-style-type: none"> <li>• Restart the PresencePLUS software.</li> <li>• If the connections are secure, call a Banner Applications Engineer.*</li> </ul>
<ul style="list-style-type: none"> <li>• Image is frozen on PC, but image on monitor properly updates.</li> <li>• Error message, “Failed to capture full-resolution image.”</li> <li>• Indicator lights on RJ-45 port are OFF.</li> </ul>	<p><b>Ethernet connection lost</b></p> <ul style="list-style-type: none"> <li>• Reconnect the cable.</li> <li>• Check the cable for any breaks, then power down and back up.</li> <li>• Replace the cable.</li> <li>• Attempt to close and reopen the PresencePLUS software.</li> <li>• If still not resolved, call a Banner Applications Engineer.*</li> </ul>
<ul style="list-style-type: none"> <li>• Focus number does not update.</li> <li>• QuickStart fails.</li> <li>• Errors when saving inspections to the Sensor.</li> </ul>	<p><b>FTP communications blocked</b></p> <ul style="list-style-type: none"> <li>• In the File pull-down menu in Internet Explorer, uncheck the Work Offline option.</li> </ul>
<p>*Support is available from your local Banner representative or a Banner Applications Engineer. Call, e-mail, fax, or write for support. Applications Engineers are available from 8:00 A.M. to 5:00 P.M. Central Time, Monday through Friday, excluding holidays.</p> <p style="text-align: center;">Local: (763) 544-3164 Toll free: 1-888-3-SENSOR (1-888-373-6767) (763) 544-3213</p> <p style="text-align: center;">sensors@bannerengineering.com</p> <p style="text-align: center;">Banner Engineering Corp. • 9714 10th Avenue North • Minneapolis, MN 55441 • USA</p>	



## Specifications, continued

<b>Memory</b>	Stores up to 12 inspection files
<b>Power</b>	<b>Voltage:</b> 10-30V dc <b>Current:</b> 500 mA max.
<b>Acquisition</b>	500 frames per second max. <b>Image size:</b> 126 x 98 pixels <b>Levels of Gray Scale:</b> 256
<b>Imager</b>	2.56 x 2.06 mm, 3.25 mm diagonal CMOS <b>Pixel Size:</b> 20 x 20 microns
<b>Exposure Time</b>	0.01 to 20.47 milliseconds
<b>Lens Mount</b>	C-mount
<b>Certifications</b>	Approvals in process

## Models/Tools

PresencePLUS P4 Models	User's Manual Part Number*	Tools							
		Locate	GEO Find	GEO Count	Edge	Object	Measure	Test	Comm.
GEO	117020	X	X	X			X	X	X
EDGE	120413	X			X	X	X	X	X

\*Available on enclosed CD or online at [www.bannerengineering.com](http://www.bannerengineering.com).



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